International Journal of Hospitality Management xxx (xxxx) xxxx

Contents lists available at ScienceDirect

International Journal of Hospitality Management

journal homepage: www.elsevier.com/locate/ijhm

In search of 'a research front' in cruise tourism studies

Alejandro Vega-Muñoz[a], Juan M. Arjona-Fuentes[b], Antonio Ariza-Montes[a,b], Heesup Han[c,*], Rob Law[d]

[a] Universidad Autónoma de Chile, Avda. Pedro de Valdivia, 425, Santiago, Chile
[b] Universidad Loyola Andalucía, C/Escritor Castilla Aguayo, 4, 14004, Córdoba, Spain
[c] College of Hospitality and Tourism Management, Sejong University, 98 Gunja-Dong, Gwanjin-Gu, Seoul, 143-747, Republic of Korea
[d] School of Hotel and Tourism Management, The Hong Kong Polytechnic University, 17 Science Museum Road, TSE East, Kowloon, Hong Kong Special Administrative Region

ARTICLE INFO

Keywords:
Tourism industry
Shipping industry
Cruise tourism
Scientometrics
Social network analysis

ABSTRACT

This article aims to provide a critical view of the global scientific production involved in cruise tourism study. Global references in this field were identified and emphasised for managing existing data to establish 'bridges' among researchers. Scientometric analysis was conducted on publications about cruise tourism in mainstream journals integrated into Web of Science. This methodology enabled us to identify current topics, relevant journals, authors, institutions, profitable countries, 'visible' and 'invisible' collaborative colleges and the research areas considered as the epicentre of the cruise tourism debate. A significant contribution of this work is the use of indicators at the three levels of scientometric complexity, i.e. scientific activity, impact and relational character.

1. Introduction

Tourism is a scientific subdiscipline within the social science that has reached great economic and social transcendence in recent decades. It covers various typologies and multiple perspectives which can be the focus of study. Tourism has been favoured in the publication of several articles, including journals dedicated exclusively to this activity and those from other scientific areas which analyse tourism activity (UNESCO, 1988; Franklin and Crang, 2001; Han and Yoon, 2015; Papathanassis and Beckmann, 2011; Clancy, 2017).

Cruise tourism is among the tourism phenomena that experience significant growth but have not received much attention (Han et al., 2019; Hung et al., 2019; Sun et al., 2018). The growing turnover, passenger volume, number of operating ships or ports and countries reached support this claim (Castillo-Manzano and López-Valpuesta, 2018; Esteve-Pérez and García-Sánchez, 2015; Mahadevan and Chang, 2017). Cruise tourism exerts a double effect on the economies of the destination ports (Chua et al., 2015). On the one hand, a direct effect is generated by the activity and the land-based consumption expenditure of passengers and crew as well as by the income received by local suppliers of cruise lines for provisioning port and ship services (Chua et al., 2015). On the other hand, an indirect effect is derived from the earnings produced by the purchases of consumables and services from local suppliers as well as by the increased consumption in the tourism economy's area of influence caused by income growth generated by tourist activities of cruise ships (Brida and Zapata, 2010; Castillo-Manzano et al., 2015).

Scientifically, cruise tourism can be studied from multiple aspects, such as business management of shipping companies, cruise management from the perspectives of the hotel and entertainment industry and economic analysis of the activity impact in destination ports and their countries of location. From an individual perspective, cruise tourism can be studied from the aspects of demand analysis, passenger and crew behavioural psychology and management of human resources of international and multicultural crews. Cruise tourism can be studied as well from the aspects of the environmental impact caused by the ever-increasing number and size of ships and the cultural implications on societies where destination ports are located, especially in developing countries (Lohman and Oliveira, 2009; Papathanassis and Beckmann, 2011). Numerous topics can be investigated given these aspects.

Despite the many areas of interest, the number of scientific papers addressing cruise tourism does not match the importance of this type of tourism, especially compared with the volume of articles published on tourism in general. This article aims to provide a critical review of the

* Corresponding author.
E-mail addresses: phd.avega@gmail.com (A. Vega-Muñoz), jmarjona@uloyola.es (J.M. Arjona-Fuentes), ariza@uloyola.es (A. Ariza-Montes), heesup.han@gmail.com (H. Han), rob.law@polyu.edu.hk (R. Law).

https://doi.org/10.1016/j.ijhm.2019.102353
Received 12 February 2019; Received in revised form 17 July 2019; Accepted 31 July 2019

scientific research on cruise tourism. As such, global references on this field are identified and highlighted for managing pre-existing knowledge to establish future 'bridges' among researchers and enhance the presently dispersed and distant understanding of this subject (Maskell, 2014). A scientometric analysis of publications on cruise tourism is conducted to achieve this objective. Mainstream journals from the Web of Science (WoS) are used to identify current topics, most relevant journals, most prolific authors, institutions, countries, the 'visible' and 'invisible' collaborative colleges and the thematic areas on which current cruise tourism debate revolves.

A significant contribution of this article is the use of the scientific activity itself, together with the application of scientometric techniques of scientific activity, impact and relational character, to put in relevance countries, research organisations and authors that constitute global referents which demarcate the frontier of knowledge and lead the 'critical mass' of global cruise tourism researchers. This study also distinguishes at the subtheme level of this kind of tourism the most prolific authors and therefore those whom they should be to deepen this field of research.

Section 2 reviews related literature to accomplish the main objective. Section 3 presents the research methodology, and Section 4 comments on the main results obtained. Section 5 critically discuses such results. In conclusion, the main limitations and the list of bibliographic references used in this study are listed in Sections 6.

2. Research background: lights and shadows of cruise tourism

An updated view of the most outstanding characteristics of cruise tourism must be provided to contextualise the scientometric analysis of the literature for future development. Like any business activity, cruise tourism offers positive and negative aspects open to debate and criticism. We are dealing with an industry with singularities and casuistry which are not typical in the traditional labour market.

2.1. Economy of the cruise industry

According to figures provided by the Cruise Lines International Association (CLIA), the cruise industry has gone from carrying 9.9 million passengers in 2001 to 26.7 million in 2017. About half of the passengers (13,018,000 or 49%) were from North America. The remaining 26%, 15%, 5.4%, 3.2% and 1.6% were from Europe, Asia, Australia/Pacific, South America and other geographical areas of the world, respectively.

Since the beginning of cruise tourism in the 1960s, the North American market has become its primary market. Nevertheless, the Asian market has been growing at a rapid rate in recent years. In 2017, China became the second country in the world with the most cruise tourism passengers (2.1 million), overtaken only by the US (CLIA, 2018).

Clancy (2017) noted that the figure would have exceeded 20 million in 2015 if half a million passengers a year have sailed since 1970. The economic report issued by CLIA in 2017 — with economic data added in 2016 combining direct, indirect and induced contributions — revealed that cruise tourism contributed an estimated $126 billion total output of goods and services to the global economy. A total of 1,021,681 FTE jobs were required for this output. Workers employed in these jobs were paid $41.1 billion (CLIA, 2017). The industry achieved a rapid worldwide growth in the last 30 years which resulted in an increase in cruise passengers that has brought a set of economic, sociocultural and environmental impacts (Chaos et al., 2018).

One of the outstanding aspects of the cruise industry's contribution to the global economy relies on the considerable benefits for developing countries either through crew employment or the resulting impact of tourist and crew expenses in destination ports —many of which are located in developing countries. However, the type of tourist who books a package on an all-inclusive basis spends very little on land. Even local operators who manage land-based excursions are entirely dependent on the prices set by the cruise companies, thereby bearing the pressure to offer an excellent service to avoid losing the concession (Klein, 2011; CBI, 2016; MacNeill and Wozniak, 2018). Producing in the Mediterranean cruise ports, the pressure relates to the volume of passengers to the local population, level of port infrastructure and condition of the homeport (Rosa-Jimenez et al., 2018).

2.2. Environmental effect

In 2017, 449 cruise ships were in operation, and the number increased by 27 in 2018, then by 24 in 2019. These ships — most with passenger capacities ranging from 3000 to 5000 people — generate a significant environmental impact resulting in carbon dioxide emissions and sulphur particles due to the type of fuel used; garbage incineration and organic waste generation result in water pollution, such as coastal water contamination with high levels of oils, detergents, plastic residues and bacteria (Rumpf et al., 2018; Wang et al., 2018). In addition, engine noise and collisions alter the ecosystem of many marine species, especially cetaceans (Klein, 2011; Caric, 2016; Lamers et al., 2015; Storrie et al., 2018). When these large ships are in a country's jurisdictional waters, they are forced to comply with the environmental regulations of the state. The problem arises when these ships sail in international waters. Society's growing awareness of the environmental problem has led many major shipping companies to introduce a complete set of systems and procedures to reduce their environmental impact, which is also utilised as a marketing element (Han and Kim, 2019; Hyun and Han, 2015). According to the cruise industry, this set of systems and procedures is successfully reducing environmental impact and being socially responsible (CLIA, 2017; Andrews et al., 2018). However, it is criticised due to lack of transparency.

2.3. Social effect

The study of the positive and negative impacts of tourism on local communities is a highly developed area of research. The differential element of the impact of cruise tourism is the massive arrival of thousands of tourists in a port, primarily in small towns (Bishop, 2010; Rodrigue and Notteboom, 2013). The search for new destinations to expand the catalogue offered by a cruise line to its potential customers in a mature market means that most of the new ports correspond to zones in developing countries. Aside from the environmental impact of preparing ports to accommodate deep-sea cruises under the expectation of future income from tourists, public authorities and large private investors attempt to convince the population of the potential benefits of cruise ships which do not always reach the local population (Seidl et al., 2007; Cheer, 2017; Lopes and Dredge, 2017; Papathanassis, 2017; MacNeill and Wozniak, 2018). The local population suffers from the massive arrival of tourists who invade their area, often with lack of respect for local customs, traditions and beliefs (Kirtsoglou and Theodossopoulos, 2004; Klein, 2011; MacNeill, 2017).

2.4. Human resource management

A sizable cruise can lodge a crew of around 1500 to 2000 people who usually work in the ship between four and ten months for 70–100 h a week. In a globalised economy where most ships sail under flags of convenience, the staff's nationalities, contract typologies, labour rights, training levels and qualifications offer nearly infinite combinations. Many matters of interest can be explored regarding this workforce, including the psychological and sociological aspects of crew behaviour in interpersonal relationships among themselves and with passengers, attitudes and motivations, occupational health and safety issues and labour rights (Terry, 2011, 2014,2018).

2.5. Market aspects

Cruise tourism is a mature market that has been operating in the same geographical areas with a consistent work methodology for decades. However, new trends are emerging in the search for business growth, such as concentration of operations (Penco and Profumo, 2017; Papathanassis, 2017), deployment of new routes and destination ports (Rodrigue and Notteboom, 2013; Ceric, 2018), search for younger customers (Gracan, 2016; Papathanassis, 2017), thematic specialisation of many ships (Gracan, 2016; Castillo-Manzano et al., 2017; Papathanassis, 2017; Whyte et al., 2018), allocation of high importance to the ship itself and onboard activities rather than onshore (Whyte et al., 2018), production of small ships with exotic destinations for experienced travellers (Whyte et al., 2018), launch of adventure cruises (Gracan, 2016) and the implementation and adaptation of opportunities offered by information technologies (Papathanassis, 2017). Ultimately, as proposed by CBI (2016) and Chen et al. (2016), many new trends are evolving in this tourist segment, making it an interesting subject for researchers (Han and Hyun, 2018).

2.6. Other topics

The range of possibilities is extensive, as all aspects of maritime navigation, pleasure tourism, hotel management in navigation and local tourism in arrivals are brought together to develop a holistic cruise experience. In this sense, many fields of knowledge, such as business management, marketing, economics, sociology, psychology, medicine, geography, environmental sciences, engineering, and technology, address the study of cruise tourism and the development of industry as well as its effects on specific countries or regions (Lohman and Oliveira, 2009; Papathanassis and Beckmann, 2011; Weeden et al., 2011; Qiu et al., 2014; Cholwill, 2015).

3. Methodology

Scientometrics is an instrument used in the social sciences. Its origin goes back to the times of 'big science', driven by the changes in scientific research during World War II and later in the 'Cold War'. Scientific progress significantly accelerated during those decades, and large-scale, government-funded projects were launched in search of global scientific hegemony. Scientometrics can quantitatively measure documented scientific activities, similar to the evaluation of economic activity, according to bibliometric laws and indicators. The ultimate objective is to assess the evolution and development of sciences as well as to evaluate scientific policies regarding certain aspects of economic and social nature (Escorsa and Maspons, 2001: Garfield, 1987; Price, 1986; Spinak, 1998; Vega and Salinas, 2017).

In the present study, scientometric analysis is performed on articles published in the WoS. Journals indexed in the last current impact factor of the WoS are included (Okumus et al., 2017), and the search vector TS = (CRUIS*) AND (TOUR*) is applied according to the recommendations of Archuby et al. (2000). This analysis aims to obtain results in the three levels of scientometric complexity, namely, scientific activity, impact and relational indicators regarding the set of identified articles (Vega and Salinas, 2017).

As for the *analysis of scientific activity*, the existence of critical mass in the study of 'cruise tourism' is reviewed first in compliance with Price's Law which enunciates the exponential growth of science over time (Price, 1976; Cleber-da-Silva et al., 2014). Concentration zones of articles found according to Bradford's dispersion law are then studied. Journals with the most frequently published scientific advances concerning cruise tourism are identified and consequently become highly specialised scientific media on a specific subject (Bulik, 1978; Morse and Leimkuhler, 1979; Pontigo and Lancaster, 1986; Cleber-da-Silva et al., 2014). Finally, we analyse the set of prolific authors in this field and their composition according to WoS categories. We also detect possible institutions where these authors are gathered as well as their presence in the main currents or research fronts in this field.

Regarding *impact analysis*, the scientific production of prolific authors are weighted according to the most significant impact granted by the Journal Citation Report (JCR) in the index of adscription Science Citation Index Expanded (SCI-EXPANDED) and/or Social Science Citation Index (SSCI) through the calculation of the Author Impact Index (IIa).

$$II_a = \sum_{j=1}^{m} \sum_{i=1}^{n} \left(\frac{A_i * \left\{ \frac{JCR_i}{\max(JCR_j)} \right\}}{ca_i} \right)$$

where:

A_i is the article published by an author in a magazine i {1,n} with A_i {0,1};

JCR_i is the WoS impact index for a specific magazine i;

JCR_j is the impact index in a WoS category for a magazine j {1,m} within the category j;

ca_i is the number of the article coauthors A_i.

Finally, the relational aspects are assessed through the analysis of social networks, following the coauthorship criterion in the 'research front', where the most relevant scientific production focuses on cruise tourism research. In this sense, the fundamentals of García-Lillo et al. (2018) are followed using the 5.05 version of the software 'Pajek: analysis and visualisation of large networks' and VOS viewer version 1.6.10.

To summarise, the selected methodology responds to future research lines listed by Köseoglu et al. (2016) for bibliometric studies in tourism, such as broadening the spectrum of analysed research journals, identifying the main knowledge contributors (authors, institutions and countries), incorporating scales considering the research quality, visualising collaboration (knowledge of social network, study growth and researchers productivity among others), accounting for the development of tourism research in developed and emerging countries and identifying the methodological processes incorporated in the research. The methodological design of the current research is also a remarkable progress over other studies carried out in the 'Hospitality, Leisure, Sport & Tourism' field by incorporating impact and relational scientometry instead of being limited to a simple analysis of the scientific activity of a given topic (for instance, Köseoglu et al., 2016; Okumus et al., 2017, 2018).

4. Results

Following the recommendations of Okumus et al. (2017) and Archuby et al. (2000) on temporary restrictions regarding obsolescence and the use of search vectors, a first list of 320 publications which meet the search criteria [TS = (CRUIS*) AND (TOUR*)] between 1980 and 2018 was obtained. Fig. 1 and Table 1 display the regression model for the period when continuous data are available from the first finding in 1991 to the last year with complete records consolidated in the WoS (2017). This model demonstrates significant growth in studies on cruise tourism, obtaining an adjustment of 71.7% of the time series of articles published in WoS. The exponential character of the model indicates that a 'critical mass' has been consolidated around cruise tourism research in recent years, as proposed by the Law of Exponential Growth of Science.

According to contribution to scientific productivity analysis worldwide, 776 authors publish 320 articles in 53 countries. Their contributions vary from 90 articles (28.1%) to one article (0.3%). As depicted in Fig. 2, the most productive countries are the US (28.1%), Spain (10.9%), Italy (9.1%), the UK (9.1%) and Canada (8.8%).

Regarding the law of dispersion of the scientific literature on cruise tourism, Bradford zones were determined following the recommendations of Urbano (2000). The cumulative number of titles in decreasing

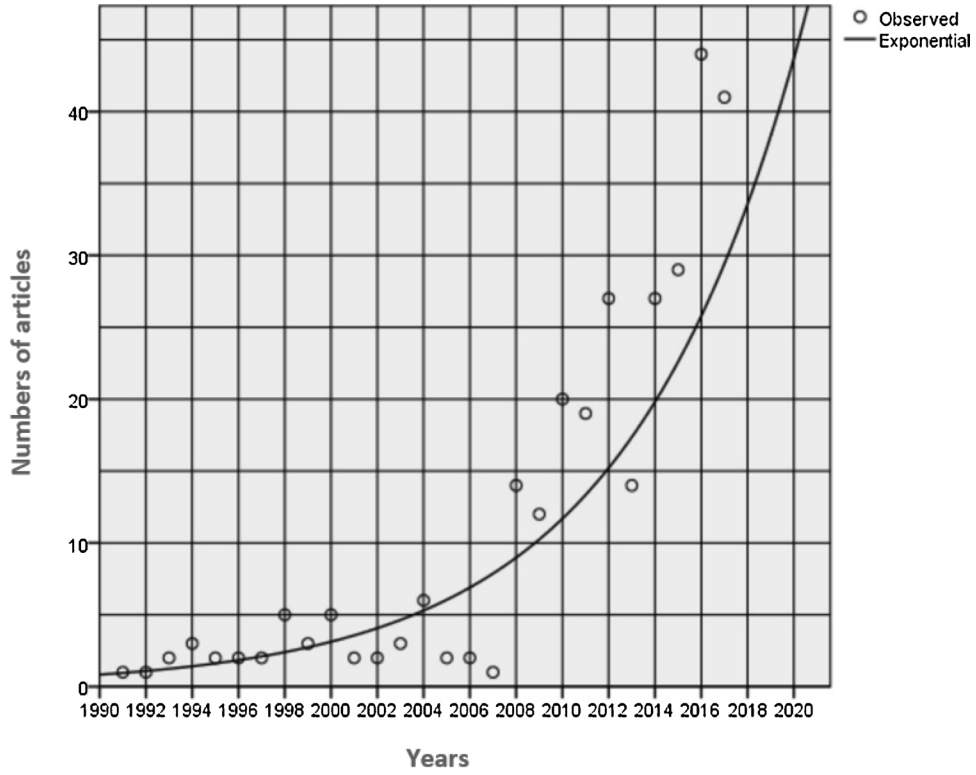

Fig. 1. Number of articles published in WoS on cruise tourism between 1991 and 2017.
Source: Elaboration with data obtained from WoS (2018).

Table 1
Model summary and parameter estimates.
Source: Own elaboration with data obtained from WoS (2018).

Equation	Model summary					Parameter estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Exponential	0.717	63.369	1	25	0.000	8.483E-115	0.132

Dependent variable: Articles.
Independent variable: Year.

order of quotes versus the cumulative number of quotes was represented on a semilogarithmic scale. As such, the point where the curve becomes a straight line projected on the abscissa axis would determine the number of titles forming the concentration nucleus. With this methodology, Table 2 presents that the 320 articles under analysis are distributed among 142 journals. However, this distribution presents a high degree of concentration around the following journals forming the nucleus: *Tourism Management* (Q1), *Annals of Tourism Research* (Q1), *Current Issues in Tourism* (Q1), *International Journal of Tourism Research* (Q2), *Journal of Travel & Tourism Marketing* (Q3) and *Tourism Economics* (Q4). All these journals belong to the WoS 'Hospitality, Leisure, Sport & Tourism' category of the SSCI.

This journal group differs significantly from the list ranked by JCR (WoS). We can see journals with less impact, which differ from the concentration that can be generated under the same criteria (Bradford) for the HLST magazine total, as shown in Table 3. However, its value is highlighted because these six sources led the in-depth discussion on cruise tourism.

Thus, the five journals that are part of the 10% of journals on HLST with the largest impact factors (JCR 2017) in WoS for the period under study (1980 to 2018) only cover 18% of the articles published. By contrast, the five journals that make up the Bradford core for the same period cover almost 30% of the articles published. However, to limit the search to cruise tourism, the 142 journals expand outside of the WoS HLST category during the period, and its Bradford core with six journals also achieves an identical percentage coverage of articles but with a different set from magazines which are the only source that remain in the three sets of 'Tourism Management', and 'Annals of Tourism Research'.

For the identification of prolific authors, the laws of Price (1976) and the recommendations of López (1996) were adopted as a starting point through which the square root of the total number of authors (776) was calculated, with a value of 27.85. Initially, the 28 most productive authors were considered. However, the author in the 29th position was counted because he had a significant similarity of scientific production to the one in the 28th position. The contribution of these 29 authors ranged from three to ten articles per author, allowing them to be segregated from the rest of the researchers with low WoS production. The 116 contributions of these authors were reduced by the intersection of cosignatures to 74 articles, which are present in 27 WoS categories (see Fig. 3), with 'Hospitality, Leisure, Sport & Tourism' as the greatest pre-eminence. Although remotely related, other relevant categories were 'Economics', 'Environmental Studies', 'Transportation', 'Environmental Sciences', 'Management', 'Green & Sustainable Science & Technology' and 'Ecology'.

In addition to the categories, given that the thematic dynamism of growth in knowledge is at an exponential rate, a natural replacement of authors exists in the time and ideas under discussion (keywords plus the assigned by WoS at the articles), as can be seen in Figs. 4 and 5.

The 'research front' must be identified, given the exponential longitudinal trend of the 320 articles analysed. Half were selected according to the obsolescence law of scientific literature (Price, 1976), which comprises those focused only on the publication period 2014–2018 and are considered contemporary. With this time restriction, only 26 'prolific contemporary authors' emerge. These authors are currently at the forefront of research on cruise tourism and therefore form the 'research front' (see Fig. 6). After purification, the 74 articles

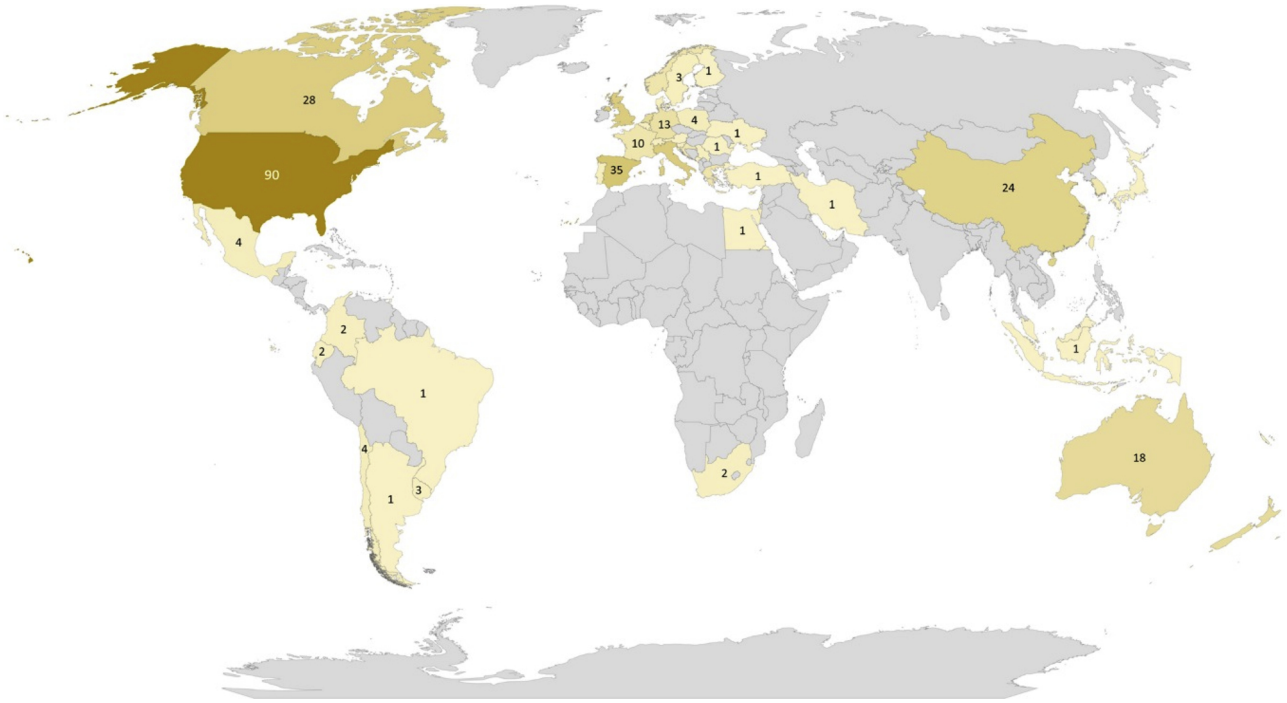

Fig. 2. Contributions to the worldwide scientific productivity of cruise tourism.
Source: Elaboration with data obtained from WoS (2018).

Table 2
Bradford zones.
Source: Own elaboration with data obtained from WoS (2018).

Bradford zones	No magazines	% Magazines	No articles	% Articles
Nucleus	6	4.2	92	29
Zone 1	19	13.4	93	29
Zone 2	117	82.4	135	42
Total	142	100	320	100

initially identified were reduced to 45 (those belonging to contemporary literature).

This exclusive group of prolific contemporary authors reduces the research front to only 18 institutions located in 11 countries/regions: Southern Cross University (Australia-AU), University of Ottawa (Canada-CA), Lakehead University (Canada-CA), University of Valencia (Spain-ES), University of Seville (Spain-ES), Technical University of Cartagena (Spain-ES), the Hong Kong Polytechnic University (China-HK), Institute for Tourism (Croatia-HR), Free University of Bozen (Italy-IT), University of Genoa (Italy-IT), University of Sassari (Italy-IT), Kore University of Enna (Italy-IT), Inha University (South Korea-KR), Wageningen University & Research (Nederland-NL), Vrije Universiteit Amsterdam (Nederland-NL), Lincoln University (New Zealand-NZ), Adam Mickiewicz University (Poland-PL) and NOAA (United States-US). These institutions are at the forefront of the production of scientific knowledge in cruise tourism worldwide.

The remaining 45 articles after debugging have been published uniquely or concurrently in a wide range of WoS categories: Business; Computer Science, Artificial Intelligence; Ecology; Economics; Engineering, Civil; Engineering, Environmental; Engineering, Marine; Environmental Sciences; Environmental Studies; Geography; Green & Sustainable Science & Technology; Hospitality, Leisure, Sport & Tourism; International Relations; Management; Marine & Freshwater Biology; Multidisciplinary Sciences; Oceanography; Operations Research & Management Science; Psychology, Applied; Sociology; Transportation; Transportation Science & Technology; Water Resources and Zoology. All these articles are indexed in the SSCI and/or in the SCI-EXPANDED. Therefore, the weighted contribution of these scientific documents to the generation of frontier knowledge can be determined in such a way that the impact factor granted by the JCR can be used to establish the IIa.

With this criterion, Table 4 ranks the primary authors in the front of cruise tourism research according to their contribution weighted by the impact factor (JCR, 2017). This table shows that the following authors stand out above others considering their best publication quartile: Lamers, from the Wageningen University & Research (WUR) of the Netherlands, and Caric, a professor at the Institute for Tourism of Croatia. Lamers' case is significant as he ranks second in the impact

Table 3
HLST journals and cruise tourism (CT) journals 1980–2018.
Source: Own elaboration with data obtained from WoS (2018).

Category	1st Decile JCR-WoS (2017)	% Magazines/% articles	Bradford zones HLST	% Journals	Bradford zones CT	% Journals
Nucleus (No magazines)	5	10 /18	5	9/29	6	4.2/29
Source	Tourism Manage. J. Travel Res. Ann. Touris. Res. J. Destin. Mark. Manag. Sport Manag. Rev.		Tourism Manage. Res. Q. Exerc. Sport Ann. Touris. Res Int. J. Hosp. Manag. Psychol. Sport Exerc.		Tourism Manage. Ann. Touris. Res. Curr. Issues Tour. Int. J. Tour. Res. J. Travel Tour. Mark. Tour. Econ.	–
Total	50	100	55	100	142	100

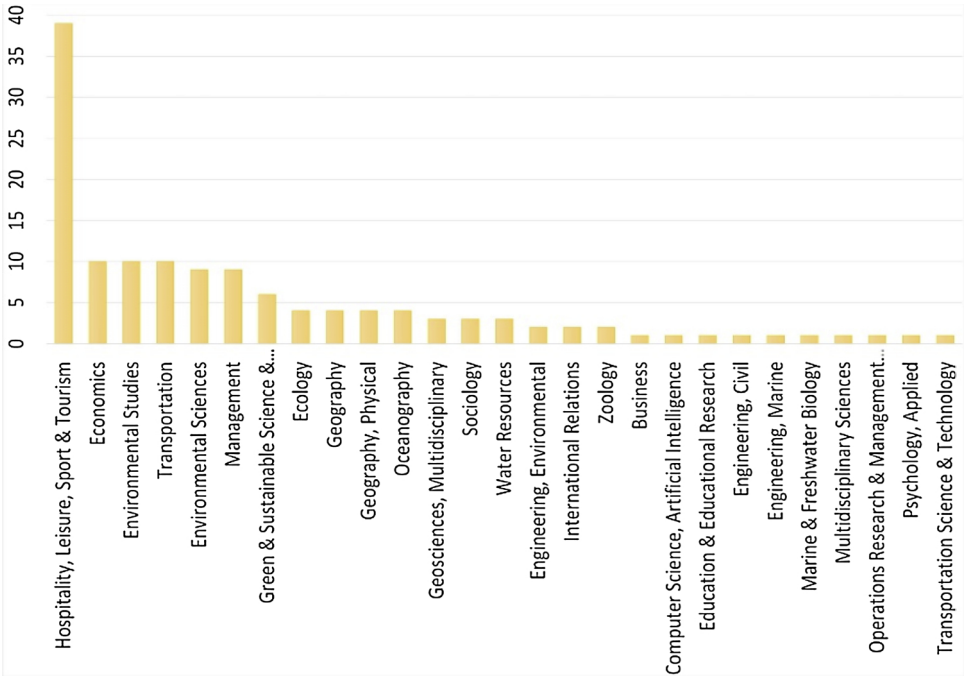

Fig. 3. Contribution to scientific productivity by WoS categories.
Source: Own elaboration with data obtained from WoS (2018).

factor ranking when he was previously 23rd out of 26 authors. The same goes for Van Tatenhove, also a member of the faculty at WUR in the Netherlands, who climbed from the 21 st to the 6th place. The most significant gap in the opposite direction is from authors who occupied the 5th and 6th positions (Hung and Penco, respectively, see Fig. 4), with 16 places down for the former and 13 for the latter.

An additional objective of this study is incorporating relational scientometrics which represents a notable advance over most bibliometric studies published thus far. As Jacobs (2010) pointed out, possible relationships in the knowledge structure of different research fields and the emergence of new research fronts or coauthorship patterns are visualised with this methodology. Fig. 7 presents the results of social network analysis by using the Pajek software. It also shows, in a relational manner, the leading 'visible' (those researching the main current of the subject under study) and 'invisible' (those where several authors work in connection despite different affiliations) colleges. This last circumstance can be manifested by coauthors when signing articles or by bibliographic coupling, i.e. a group of authors who are not formally connected but defend the same thought process by using the same references in their writings (Price, 1986; López, 1996).

Fig. 7 shows the 45 articles of prolific contemporary authors in circles, the 18 institutions to which they are affiliated in squares, the 11 countries of origin in diamonds and the 26 authors at the forefront of research in triangles. The arcs or connection lines represent the

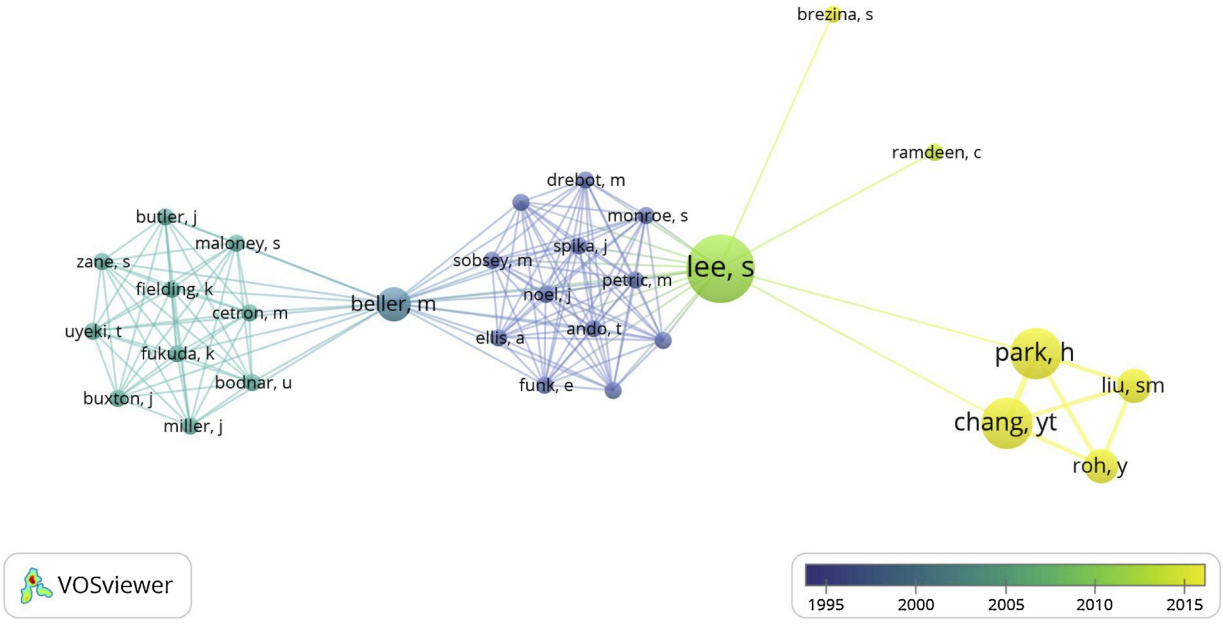

Fig. 4. Temporary evolution of authors in WoS about cruise tourism.
Source: Own elaboration with data obtained from WoS (2018).

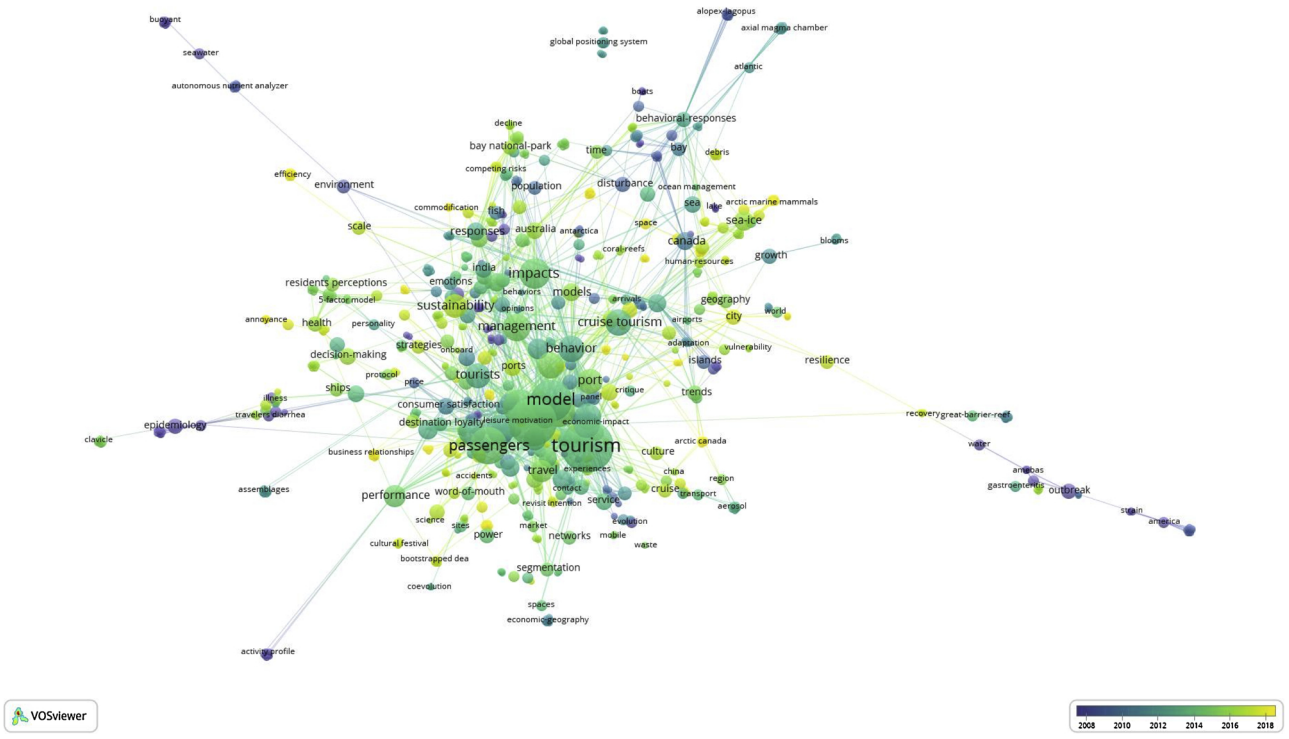

Fig. 5. Temporary evolution of central ideas (keywords plus) in WoS on cruise tourism.
Source: Own elaboration with data obtained from WoS (2018).

connections among the different relational elements whose thickness reflects the strength or intensity of such links spatially arranged by separate and preordered components by using the algorithm of Kamada and Kawai (1989).

a) Italy, due to the joint work of the Free University of Bozen (FUB) with the University of Sassari (USS) and the Kore University of Enna (KUE). This bridge work among the FUB, the USS and the KUE is represented by the arches joining the first one to the other two. Aside from these institutions, the University of Genoa (UOG) does a remarkable independent and isolated job.
b) Spain, where the unconnected contributions of three institutions and their prolific authors stand out, without arcs of connection: University of Valencia (UOV), University of Seville (UOS) and Technical University of Cartagena (TUC).
c) The Netherlands, led by researchers from WUR and by the collaborative college that makes up the Vrije Universiteit Amsterdam (VUA) with Adam Mickiewicz University (AMU) from Poland. This collaborative college is based on the cosignature between the authors of these two institutions' articles, that is, A21, A23 and A36.
d) In addition to these countries, a collaborative college comprises Canada and New Zealand, the result of the joint work of researchers from the University of Ottawa (UOO) and Lakehead University (LHU). This collaboration materialised in the cosignature of A01, A25, A31 and A33.
e) A remarkable body of knowledge is being developed in other countries but without any connection with prolific authors from other institutions located in different countries. The autonomous

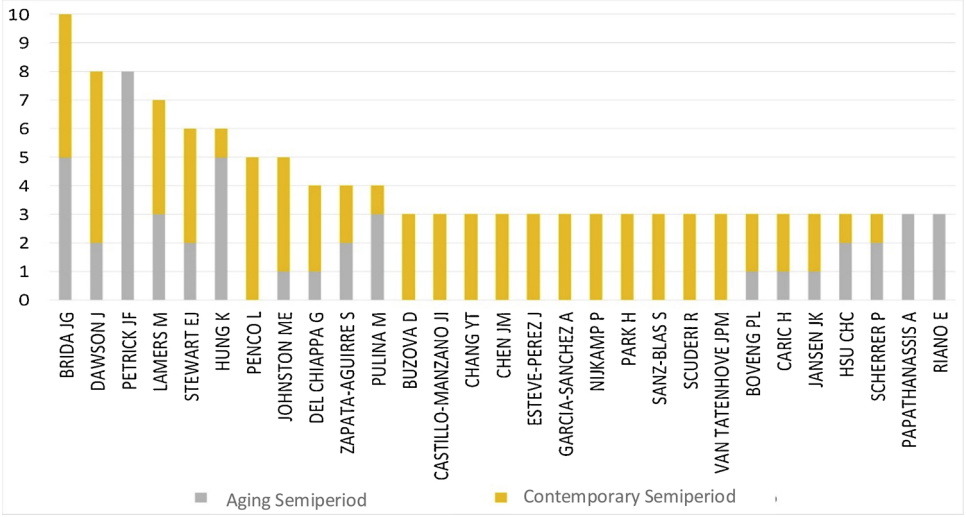

Fig. 6. Prolific contemporary authors in cruise tourism.
Source: Own elaboration with data obtained from WoS (2018).

Table 4
Ranking of authors according to their best publication quartile in the author impact index.
Source: Own elaboration with data obtained from WoS (2018).

#	Author	IIa	Country	#	Author	IIa	Country
1	LAMERS	0.940	NL	14	ESTEVE-PEREZ	0.324	ES
2	CARIC	0.820	HR	15	GARCIA-SANCHEZ	0.324	ES
3	DEL CHIAPPA	0.602	IT	16	SCHERRER	0.281	AU
4	DAWSON	0.595	CA	17	SCUDERI	0.273	IT
5	BRIDA	0.571	IT	18	HSU	0.207	HK
6	VAN TATENHOVE	0.517	NL	19	PENCO	0.199	IT
7	CASTILLO-MANZANO	0.484	ES	20	ZAPATA-AGUIRRE	0.135	IT
8	BUZOVA	0.474	ES	21	HUNG	0.121	HK
9	SANZ-BLAS	0.474	ES	22	PULINA	0.103	IT
10	STEWART	0.415	NZ	23	CHEN	0.093	NL
11	JOHNSTON	0.415	CA	24	NIJKAMP	0.093	PL
12	CHANG	0.333	KR	25	BOVENG	0.073	US
13	PARK	0.333	KR	26	JANSEN	0.073	US

work of NOAA (US), the Inha University (INU) from Korea, the Institute for Tourism (IFT) from Croatia (HR), the Southern Cross University (SCU) from Australia and the Hong Kong Polytechnic University (HKPolyU) stands out in this sense.

Conversely, Fig. 8 illustrates the grouping of prolific authors according to the research topic covered by their published works in the different application fields standardised in the WoS.

Fig. 8 reveals that numerous researchers study cruise tourism (CRUISTOUR) as a social science (SOCSCI), in which they associate it mainly with business and economics (BUSECO), especially transport (TRANSP), psychology (PSYCHO) and computer sciences (COMSCI). Without abandoning the social sciences, science and technology (SCITEC) also have a prominence, especially from the perspective of environmental sciences and ecology (ENVECO). Aside from studying cruise tourism as a social science, this topic is also researched, albeit less profusely, from the engineering (ENGINE) perspective at the TUC in Spain and the Institute for Tourism (IFT) in Croatia. Moreover, CRUISTOUR is studied under the lenses of zoology (ZOOLOG) and marine and freshwater biology (MARFWB). This last approach is focused on the select group of authors from the National Oceanic and Atmospheric Administration (NOAA) in the US.

The main fields of study of prolific authors are identified through the preliminary analysis, and this identification can help establish strategic guidelines for building collaborative bridges among researchers. The three levels of contribution must be distinguished. Firstly, regarding impact, Prof. Machiel Lamers at the Environmental Policy Group of the Department of Social Sciences, WUR in the Netherlands stands out. According to the IIa proposed in this research, Prof. Lamers excels in topics ranging from Social Sciences to Science and Technology.

Secondly, Italy stands out for the quantity of contemporary production with the contributions of two principal researchers. The first principal researcher is Prof. Lara Penco at the Italian Excellence Centre on Integrated Logistics of the Department of Economics and Business (UOG). She works mainly in the area of Business and Economics of the transport sector. The second principal researcher is Prof. Juan Gabriel Brida in the Competence Centre in Tourism Management and Tourism Economics (FUB), which explores cruise tourism within the social sciences from the perspective of business and economics, with elements of computer science.

Finally, considering the contemporary production level, the scientific production standard of Prof. Jackie Dawson in the Canada Research Chair in Environment, Society and Policy of the Department of Geography (UOO) stands out. From a social science approach, this professor incorporates science and technology themes into the cruise tourism research, with emphasis on environmental sciences and ecology aspects.

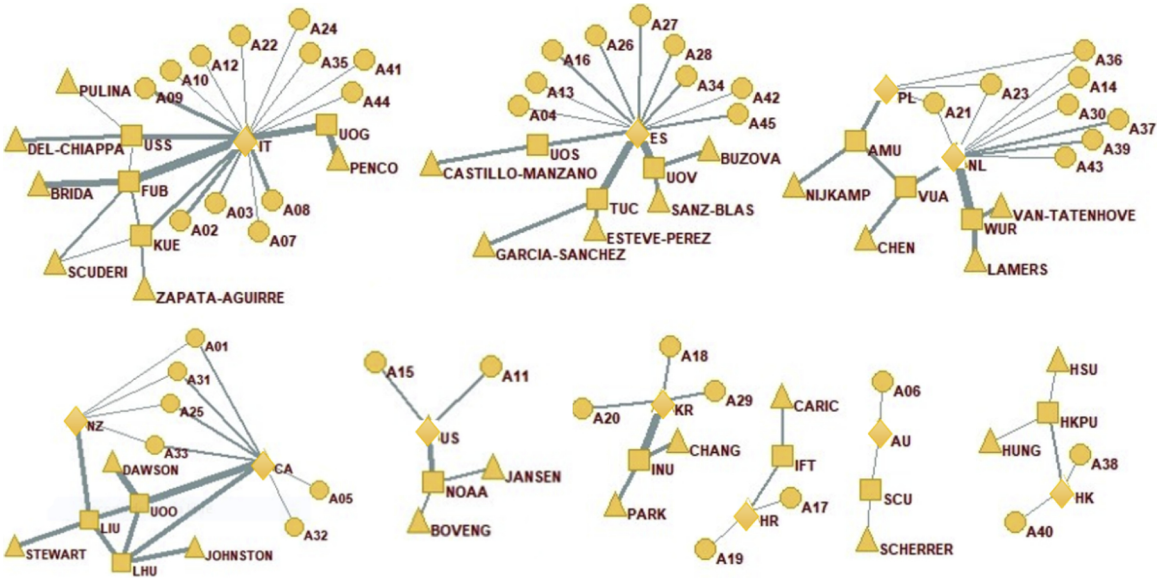

Fig. 7. Colleges on the front lines of cruise tourism research.
Source: Own elaboration with data obtained from WoS (2018).

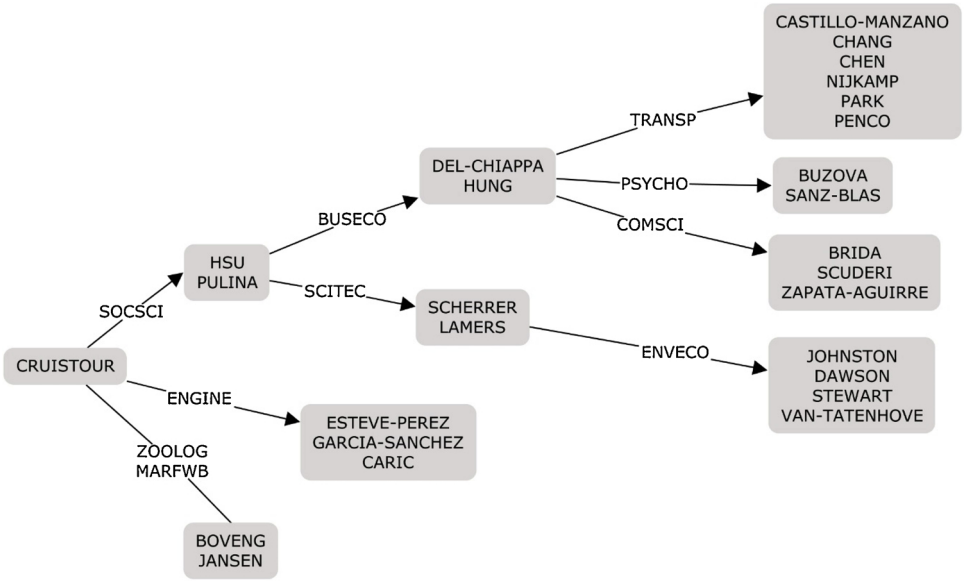

Fig. 8. Authors according to main application fields in the study of cruise tourism.
Source: Own elaboration with data obtained from WoS (2018).

5. Discussion

The scientometric analysis developed in this work attempted to provide a critical view of scientific research on cruise tourism. On the basis of scientific activity, impact and relational indicators, this methodology allowed a systematic analysis (following the laws of growth, dispersion, productivity and obsolescence) of the knowledge generated and disseminated to society by scientific researchers of cruise tourism. Cruise tourism research has experienced exponential scientific growth in recent years, thus complying with the fundamental principles of Price's Law (1976). With the results obtained, global references in this field were identified. On the basis of existing and available documented information, 'bridges' can be established to excel present knowledge, which is distant in geographical, disciplinary and/or academic terms.

The current research analysed a broad spectrum of 320 articles published in 142 WoS journals. The results of this study showed a significant increase in the number of articles published in from 1980 to 2018. Applying Bradford's laws, the scientometric analysis identified a core of six journals where the academic debate and discussion about cruise tourism is centred, namely, *Tourism Management* (26), *International Journal of Tourism Research* (16), *Annals of Tourism Research* (14), *Current Issues in Tourism* (12), *Journal of Travel & Tourism Marketing* (12) and *Tourism Economics* (12). These journals are included in the 'Hospitality, Leisure, Sport & Tourism' category of the SSCI. Many of these journals are also from other WoS categories, suggesting that cruise tourism research attracts the attention of other areas of scientific knowledge. For instance, 50 articles were in journals from the Environmental Sciences category, whereas 34 works were in the Geography category. This circumstance shows that cruise tourism is a tourist activity that can be the subject of research from different approaches and disciplines. In this sense, Papathanassis and Beckmann (2011) warn that, despite diversity, concentration in business, management and economic areas is higher than that in other disciplines, such as sociology, psychology, environment, geography, engineering and technology. However, Whyte (2016) has highlighted that research in this field is fragmented because of the multidisciplinary nature and relatively young status of cruise tourism research.

Analysing the causes of this disintegration can be a fascinating subject for an industry that needs great interdisciplinary collaboration, especially to holistically understand the challenges it will face in the immediate future. Within this cooperative framework, a small group of 26 prolific contemporary researchers has been identified (reduced according to Price's Laws by the square root of the total number of authors and in accordance with the temporal median of their publications, considering only the most recent semi-period). These contemporary researchers currently constitute the research front. By digging into the curriculum of these academics, this study concludes that cruise tourism is not a final research area. Conversely, most researchers extend their research scope to other tourism and hospitality fields or to other knowledge domains which, in certain cases, have little to do with cruise tourism. As an example, the most prolific author by the impact factor (Lamers of WUR in the Netherlands) focuses his research approach on tourism but also on sustainable development and water management.

The 26 authors at the research front are grouped into 18 institutions located in only 11 countries. Hence, institutional collaborations are limited, and great creativity is missing in this research field. The results reveal little connection among authors, even among those from the same country. An exception to this tendency is Italy which reflects a certain degree of interrelation among researchers from Free University of Bozen, University of Sassari and Kore University of Enna. The cooperation among different disciplines can increase productivity by enriching traditional studies with polyhedral research questions of a broad, highly diverse and complex approach. Despite the proven correlation among collaboration, productivity and impact of contributors, this action remains difficult among academics (Olson et al., 2008) and is one of the most significant challenges faced by the scientific community, as highlighted in the current work.

Finally, the scientometric analysis highlights the areas of interest that the most prolific authors are working on. These themes are framed in three major knowledge branches: two authors (7.7%) address the research problem from the zoology or marine and freshwater biology field (Peter Boveng and biologist John Jansen, researchers at the Polar Ecosystems Program of the Marine Mammal Laboratory at the Alaska Fisheries Science Center of the NOAA in the United States). Three (11.5%) do it from the engineering field (Hrvoje Caric of the Institute for Tourism of Croatia, Jerónimo Esteve-Pérez of the Department of Naval Technology and Antonio García-Sánchez of the Research Group in Economic Analysis and Tourism of the Department of Economics, the last two affiliated to the TUC). However, the most prolific researchers (21, representing 80.8%) study cruise tourism from the social sciences, mainly from the fields of economics and business (two out of three) and also from a scientific and technological field (one out of three). This

concentration can be coherent with the double orientation of literature (technical and practical) referred to by Vogel (2011). The former is related to topics such as economics and statistics, human resources and education, marketing, strategy and policy, whereas the latter is focused on measuring the performance of cruise companies.

In sum, the results of the scientometric analysis provided a systematised overview of the research conducted regarding cruise tourism over the last four decades. The critical analysis identified the main trends regarding number of publications, most relevant journals, most prolific authors, institutions and countries and the collaborative networks among authors and the research fields found at the epicentre of the cruise tourism debate.

The launch of issues focused on specific topics insufficiently explored to date. The organisation of international congresses aimed at networking researchers from different countries to establish bridges of communication among different disciplines that are currently distant.

6. Limitations

This study has several limitations. Firstly, future studies should apply advanced or relational scientometric analysis, including articles co-citations, co-word analysis in detail (using the author's keywords or the keywords assigned by WoS) and the analysis of 'invisible' colleges through bibliographic coupling. Secondly, they should delve into specific application fields, such as the social sciences, business and economics or psychology. Thirdly, this study does not analyse the academic trajectory of prolific authors, although it identifies common patterns which can be of significant interest in the training of future young researchers. Finally, incorporating qualitative meta-analytical studies based on frontier publications and elaborated by prolific contemporary authors can enhance theoretical understanding of specific scientific discourses in the current research of cruise tourism.

References

Andrews, J., Babb, D., Barber, D.G., 2018. Climate change and sea ice: shipping in Hudson Bay, Hudson Strait, and Foxe Basin (1980–2016). Elementa-Sci. Anthropocene 6, 19.

Archuby, G.G., Cellini, J., González, C.M., Pené, M.G., 2000. Interface de recuperación para catálogos en línea con salidas ordenadas por probable relevancia. Ciência da Informação 29 (3), 05–13.

Bishop, M.L., 2010. Tourism as a small-state development strategy: pier pressure in the Eastern Caribbean? Prog. Dev. Stud. 10 (2), 99–114.

Brida, J.G., Zapata, S., 2010. Cruise tourism: economic, socio-cultural and environmental impacts. Int. J. Leis. Tour. Mark. 1 (3), 205–2016.

Bulik, S., 1978. Book use as a bradford-zipf phenomenon. Coll. Res. Libr. 39 (3), 215–219.

Castillo-Manzano, J.I., López-Valpuesta, L., 2018. What does cruise passengers' satisfaction depend on? Does size really matter? Int. J. Hosp. Manag. 75, 116–118.

Castillo-Manzano, J.I., López-Valpuesta, L., Alanis, F.J., 2015. Tourism managers' view of the economic impact of cruise traffic: the case of southern Spain. Curr. Issues Tour. 18 (7), 701–705.

Castillo-Manzano, J.I., Castro-Nuño, M., López-Valpuesta, L., 2017. When Las Vegas takes to the sea: new trends in cruising. Tour. Econ. 24 (1), 135–140.

Caric, B., 2016. Challenges and prospects of valuation-cruise ship pollution case. J. Clean. Prod. 111, 487–498.

CBI, Ministry of Foreign Affairs, 2016. What are the Opportunities for Cruise Tourism with Guests from Europe? https://www.cbi.eu/market-information/tourism/cruise-tourism/.

Ceric, D., 2018. Cruise tourism: from regional saturation towards global dynamic equilibrium. In: Muller, D.K., Wieckowski, M. (Eds.), Tourism in Transitions, Geographies of Tourism and Global Change. Springer International.

Chaos, S.R., Roca, D.P., Marchan, S.S., Conejo, A.S.A., 2018. Cruise passenger impacts on mobility within a port area: case of the Port of Barcelona. Int. J. Tour. Res. 20 (2), 147–157.

Cheer, J.M., 2017. Cruise tourism in a remote small Island. In: Dowling, R., Weeden, C. (Eds.), Cruise Ship Tourism. CAB International, Brighton, UK, pp. 408–423.

Chen, J.M., Neuts, B., Nijkamp, P., Liu, J.J., 2016. Demand determinants of cruise tourists in competitive markets: motivation, preference and intention. Tour. Econ. 22 (2), 227–253.

Cholwill, M.J., 2015. Reflecting on the Development of British Ocean Cruise Tourism: Keeping the Romance Afloat. Research Theses, Master of Philosophy, Faculty of Business. Plymouth: Plymouth University. http://hdl.handle.net/10026.1/3549.

Chua, B.-L., Lee, S., Goh, B., Han, H., 2015. Impact of cruise service quality and price on vacationers' cruise experience: moderating role of price sensitivity. Int. J. Hosp. Manag. 44, 131–145.

Clancy, M., 2017. Power and profits in the global cruise industry. In: Dowling, R., Weeden, C. (Eds.), Cruise Ship Tourism. CAB International, Brighton, UK.

CLIA, 2017. The Contribution of the International Cruise Industry to the Global Economy in 2016. Business Research & Economic Advisors, Washington DC: Phillipsburg.

CLIA, 2018. Cruise Industry Outlook. https://cruising.org/docs/default-source/research/clia-2018-state-of-the-industry.pdf?sfvrsn=2.

Cleber-da-Silva, A., Adilson-Luiz, P., Márcio, M., Moisés-Lima, D., Gonzales-Aguilar, A., 2014. Análise bibliométrica do periódico Transinformação. El profesional de la información 23 (4), 433–442.

Escorsa, P., Maspons, R., 2001. De La Vigilancia Tecnológica a La Inteligencia Competitiva. Pearson Educación, Madrid.

Esteve-Pérez, J., García-Sánchez, A., 2015. Cruise market: stakeholders and the role of ports and tourist hinterlands. Marit. Econo. Logist. 17 (3), 371–388.

Franklin, A., Crang, M., 2001. The trouble with tourism and travel theory? Tourist Stud. 1 (1), 5–22.

Garfield, E., 1987. Little Science, Big Science… and beyond gathers together the major works of Price, Derek, Desolla. Curr. Contents 11, 3–6.

García-Lillo, F., Claver-Cortés, E., Úbeda-García, M., Marco-Lajara, B., Zaragoza-Sáez, P.C., 2018. Mapping the 'intellectual structure' of research on human resources in the 'tourism and hospitality management scientific domain': reviewing the field and shedding light on future directions. Int. J. Contemp. Hospitality Manag. 30 (3), 1741–1768.

Gracan, D., 2016. The role of strategic management in the cruising tourism market offer. Pomorski zbornik 51, 103–116.

Jacobs, D., 2010. Demystification of Bibliometrics, Scientometrics, Informetrics and Webometrics. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.464.8390&rep=%20rep1&type=pdf.

Han, H., Kim, W., 2019. Vacationers´norm-based behavior in developing environmentally sustainable cruise tourism. J. Qual. Assur. Hospitality Tourism 20 (1), 89–106.

Han, H., Hwang, J., Lee, M.J., Kim, J., 2019. Word-of-mouth, buying, and sacrifice intentions for eco-cruises: exploring the function of norm activation and value-attitude-behavior. Tourism Manag. 70, 430–443.

Han, H., Hyun, S., 2018. Role of motivations for luxury cruise travelling, satisfaction, and involvement in building traveller loyalty. Int. J. Hospitality Manag. 70, 75–84.

Han, H., Yoon, H., 2015. Hotel customers' environmentally responsible behavioral intention: impact of key constructs on decision in green consumerism. Int. J. Hospitality Manag. 45, 22–33.

Hung, K., Wang, S., Guillet, B.D., Liu, Z., 2019. An overview of cruise tourism research through comparison of cruise studies published in English and Chinese. Int J Hospitality Manag. 77, 207–216.

Hyun, S., Han, H., 2015. Luxury cruise travelers: other customer perceptions. J. Travel Res. 54 (1), 107–121.

Kamada, T., Kawai, S., 1989. An algorithm for drawing general undirected graphs. Inf. Process. Lett. 31 (1), 7–15.

Kirtsoglou, E., Theodossopoulos, D., 2004. 'They are taking our culture away' tourism and culture commodification in the Garifuna Community of Roatan. Critique Anthropol. 24 (2), 135–157.

Klein, R.A., 2011. Responsible cruise tourism: issues of cruise tourism and sustainability. J. Hospitality Tourism Manag. 18 (1), 107–116.

Köseoglu, M.A., Rahimi, R., Okumus, F., Liu, J., 2016. Bibliometric studies in tourism. Ann. Tourism Res. 61, 180–198.

Lamers, M., Eijgelaar, E., Amelung, B., 2015. The environmental challenges of cruise tourism: impacts and governance. In: Hall, C.M., Gossling, S., Scott, D. (Eds.), The Routledge Handbook of Tourism and Sustainability. Routledge, London.

Lohman, G., Oliveira, O., 2009. The state of the art in cruise tourism: an analysis of 66 international journal articles. TTRA (Travel and Tourism Research Association) Annual Conference 215–228.

Lopes, M.J., Dredge, D., 2017. Cruise tourism shore excursions: Value for destinations? Tourism Plan. Dev.

López, P., 1996. Introducción a La Bibliometría. Editorial Promolibro, Valencia.

MacNeill, T., 2017. Development as Imperialism: power and the perpetuation of poverty in afro-indigenous communities of coastal Honduras. Humanity Soc. 41 (2), 209–239.

MacNeill, T., Wozniak, D., 2018. The economic, social, and environmental impacts of cruise tourism. Tourism Manag. 66, 387–404.

Mahadevan, R., Chang, S., 2017. Valuing shipscape influence to maximise cruise experience using a choice experiment. Int. J. Hospitality Manag. 67, 53–61.

Maskell, P., 2014. Accessing remote knowledge-the roles of trade fairs, pipelines, crowdsourcing and listening posts. J. Econ. Geogr. 14, 883–902.

Morse, Ph.M., Leimkuhler, F.F., 1979. Technical note - exact solution for the bradford distribution and its use in modeling informational data. Operations Res. 27 (1), 187–198.

Okumus, F., Köseoglu, M.A., Morvillo, A., Altin, M., 2017. Scientific progress on strategic management in hospitality and tourism: a state-of-the-art. Tourism Rev. 72 (3), 261–273.

Okumus, B., Köseoglu, M.A., Ma, F., 2018. Food and gastronomy research in tourism and hospitality: a bibliometric analysis. Int. J. Hospitality Manag. 73, 64–74.

Olson, G.M., Zimmerman, A., Bos, N., 2008. Scientific Collaboration on the Internet. The MIT Press, Cambridge, MA.

Papathanassis, A., Beckmann, I., 2011. Assessing the 'poverty of cruise theory' hypothesis. Ann. Tourism Res. 38 (1), 153–174.

Papathanassis, A., 2017. Cruise tourism management: state of the art. Tourism Rev. 72 (1), 104–119.

Penco, L., Profumo, G., 2017. Mergers, acquisitions and alliances in the cruise tourism industry. Tourism Hospitality Res. https://doi.org/10.1177/1467358417742686.

Pontigo, J., Lancaster, F.W., 1986. Qualitative aspects of the Bradford distribution. Scientometrics 9 (1-2), 59–70.

Price, D., 1976. A general theory of bibliometric and other cumulative advantage

processes. J. Assoc. Inf. Sci. 27, 292–306.
Price, D., 1986. Little Science, Big Science – and Beyond. Columbia University Press, NY.
Qiu, L., Gao, C., Dai, T., 2014. The market effect and value-added research about cruise tourism industry. Int. J. Bus. Soc. Sci. 5 (13), 170–176.
Rodrigue, J.P., Notteboom, T., 2013. The geography of cruises: itineraries, not destinations. Appl. Geogr. 38, 31–42.
Rosa-Jimenez, C., Perea-Medina, B., Andrade, M.J., Nebot, N., 2018. An examination of the territorial imbalance of the cruising activity in the main Mediterranean port destinations: effects on sustainable transport. J. Transport Geogr. 68, 94–101.
Rumpf, S.B., Alsos, I.G., Ware, C., 2018. Prevention of microbial species introductions to the Arctic: the efficacy of footwear disinfection measures on cruise ships. Neobiota 37, 37–49.
Seidl, A., Guiliano, F., Pratt, L., 2007. Cruising for colones: tourism economics in Costa rica. Tourism Econ. 13 (1), 67–85.
Spinak, E., 1998. Indicadores cienciometricos. Ciência da Informação 27 (2), 141–148.
Storrie, L., Lydersen, C., Andersen, M., Wynn, R.B., Kovacs, K.M., 2018. Determining the species assemblage and habitat use of cetaceans in the Svalbard Archipelago, based on observations from 2002 to 2014. Polar Res. 37 (1). https://doi.org/10.1080/17518369.2018.1463065.
Sun, X., Kwortnik, R., Gauri, D.K., 2018. Exploring behavioural differences between new and repeat cruisers to a cruise brand. Int. J. Hospitality Manag. 71, 132–140.
Terry, W.C., 2011. Geographic limits to global labor market flexibility: the human resources paradox of the cruise industry. Geoforum 42 (6), 660–670.
Terry, W.C., 2014. The perfect worker: discursive makings of Filipinos in the workplace hierarchy of the globalized cruise industry. Soc. Cultur. Geogr. 15 (1), 73–93.
Terry, W.C., 2018. Precarity and guest work in US tourism: J-1 and H-2B visa programs. Tourism Geogr. 20 (1), 85–106.
UNESCO, 1988. Proposed International Standard Nomenclature for Fields of Science and Technology. UNESCO/NS/ROU/257 rev.1, París: UNESCO. http://unesdoc.unesco.org/images/0008/000829/082946eb.pdf.
Urbano, C., 2000. El análisis de citas en publicaciones de usuarios de bibliotecas universitarias: estudio de tesis doctorales en informática de la Universidad Politécnica de Cataluña, 1996-1998 Vol. 1 Universitat de Barcelona, Tesis doctoral] Barcelona. https://www.tesisenred.net/handle/10803/2891.
Vega, A., Salinas, C.M., 2017. Scientific production analysis in public affairs of Chile and Peru. Challenges Better Public Manag. Lex 15 (20), 463–478.
Vogel, M.P., 2011. Critical cruise research in the age of performativity. In: Gibson, P., Papathanassis, A., Milde, P. (Eds.), Cruise Sector Challenges. Gabler Verlag-Springer Fachmedien., Wiesbaden, Germany.
Wang, S.A., Zhen, L., Dan, Z.G., 2018. Dynamic programming algorithms for selection of waste disposal ports in cruise shipping. Transp. Res. B Methodol. 108, 235–248.
Weeden, C., Lester, J., Thyne, M., 2011. Cruise tourism: emerging issues and implications for a maturing industry. J. Hospitality Tourism Manag. 18 (1), 26–29.
Whyte, L.J., 2016. Cruise Tourists' Perceptions of Destination: Exploring Push and Pull Motivational Factors in the Decision to Take a Cruise Vacation. The University of Queensland, Australia.
Whyte, L.J., Packer, J., Ballantyne, R., 2018. Cruise destination attributes: measuring the relative importance of onboard an onshore aspects of cruising. Tourism Recreation Res. 43 (4), 470–482.